(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
26 September 2002 (26.09.2002)

PCT

(10) International Publication Number
WO 02/074548 A2

(51) International Patent Classification[7]: B41M 1/00

(21) International Application Number: PCT/GB02/01250

(22) International Filing Date: 18 March 2002 (18.03.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

0106603.4	16 March 2001 (16.03.2001)	GB
0108360.9	3 April 2001 (03.04.2001)	GB

(71) Applicant *(for all designated States except US)*: **SHERWOOD TECHNOLOGY LTD.** [GB/GB]; Heathcoat Building, Nottingham Science & Technology Park, University Boulevard, Nottingham NG7 2QJ (GB).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: **KHAN, Nazir** [GB/GB]; Sherwood Technology Ltd., Heathcoat Building, Nottingham Science & Technology Park, University Boulevard, Nottingham NG7 2QJ (GB).

(74) Agent: **GILL JENNINGS & EVERY**; Broadgate House, 7 Eldon Street, London EC2M 7LH (GB).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 02/074548 A2

(54) Title: LASER-MARKABLE COMPOSITIONS

(57) Abstract: A laser-markable composition comprises a binder and an oxyanion of a multivalent metal.

LASER-MARKABLE COMPOSITIONS

Field of the Invention

This invention relates to a composition that can be extruded or formulated as a lacquer and is also capable of being printed by use of a laser.

Background of the Invention

Various proposals have been made, in order to achieve effective printing on a substrate, by causing a change of colour in the substrate on which the printing is to appear. Various pigments have been proposed, which can be used to mark a substrate on the application of laser energy. Some of these proposals may be found in, for example, WO-A-00/43456, JP-A-11001065, EP-A-0522370, EP-A-0797511, US-A-5053440, US-A-5350792 (a plastics moulding composition comprising a polyoxymethylene and animal charcoal), US-A-5928780, US-A-6017972 and US-A-6019831. US-A-5489639 and US-A-5884079 disclose that copper hydroxy phosphate is a laser-markable material.

Ammonium octamolybdate, having the formula $(NH_4)_4Mo_8O_{26}$ and abbreviated herein as AOM, is a readily available material that has fire-retardant properties. For this purpose, it has been formulated with polymers such as polyvinyl chloride (PVC). For example, PVC-containing cables may contain AOM as a smoke-suppressing agent. AOM is an example of an oxyanion of a multivalent metal; many compounds of this type exist in coloured lower valence or non-stoichiometric states.

Printing on packaging such as cartonboard is of considerable commercial importance. This may be simply to provide visible information to a person handling the packages, but is also required for bar-coding and other marking that is intended to be read by machine. This entails two particular problems.

Firstly, the most economical packaging material tends to be brown or some other indeterminate colour, against which bar-coding in, say, black has low contrast (typically grade C or D). Secondly, because of the need to customise packaging, there is wastage involved in printing information on packaging that has to be adapted for each particular customer.

Summary of the Invention

It has been found that many oxyanions in combination with polymer binders absorb at the wavelength of CO_2 laser light (10,600 nm) and undergo a colour change due to a change in oxidation state, but are not affected by ultraviolet light (commonly used for polymer curing) or by the temperatures, typically around 200-300°C, used in extrusion. AOM behaves in this way. It is thus effectively laser-selective, and provides a very suitable material for use in inks intended for application to surfaces which may be required to undergo a heat treatment or for incorporation into polymer extrusions, and be marked by the application of laser light.

According to one aspect of the present invention, an ink composition comprises:

a solvent;

a binder, preferably but not essentially having a labile group; and

an oxyanion of a multivalent metal.

According to a further aspect of the invention, a polymer laminate or extrudate incoporates a laser-markable material such as an oxyanion of a multivalent metal. This is useful for producing tamper-proof labels.

According to yet another aspect of the present invention, a method for providing an image on a substrate comprises applying, to a relatively small area of the substrate, a formulation comprising a pigment and a component that forms an image on irradiation with laser light, wherein the image has greater contrast with respect to the pigment than with respect to the substrate. As in other aspects of the invention, the component may be an oxyanion of a multivalent metal.

This method allows high contrast to be achieved (typically grade A or B) between the image and its immediate background. Further, the fact that the image can be provided on demand, and is not dependent on the supply of the substrate, means that the wastage inherent in customisation can be avoided; this can lead to substantial savings in cost, for packaging produced in high volume.

Description of Preferred Embodiments

In an oxyanion-containing compound for use in the invention, the cation may be ammonium or an alkali or alkaline earth metal, but is not critical. The oxyanion may be a molybdate, tungstate or analgous transition metal compound. Such compounds include di- and hepta-molybdates. The compound is preferably AOM; the following description refers to AOM for the purposes of illustration only. Currently, AOM is preferred because it is readily available, and is selective for a robust, low-power CO_2 laser operating at about 10,600 nm.

An ink formulation to be used in the invention may be water-based, solvent-based, or UV-curable, and it may be a solution or dispersion. The formulation may include a chargeable component, for use in an ink jet printer.

The binder and the AOM are intimately mixed with the solvent which may be selected from those usually used for inks and lacquers, e.g. water, ethanol, ethyl acetate, isopropyl alcohol, hydrocarbons, etc. The components may be present in solution and/or dispersion. The amount of the AOM in the ink is typically 1 to 90% by weight. The binder is typically polymeric, and may be selected from commercially-available polymers including acrylics, celluloses, PVOH, polyesters, etc. The binder preferably includes a labile group such as hydroxyl, acetoxy, ether acetal or halogen and this has the function of undergoing elimination reaction, to give a colour-forming entity (see also PCT/GB02/00862).

AOM can be incorporated into various polymer systems and milled, using a bead mill, to a desired particle size, without any technical difficulty. Examples of polymer systems in which AOM has been successfully incorporated and milled include nitrocellulose solution in alcohol/ethyl acetate, cellulose acetate propionate solution in alcohol/ethyl acetate, polyvinyl butyral soution in alcohol/ethyl acetate, solvent-based polyurethane resin, solvent-based epoxide resin, solvent-based polyester resin, water-based acrylic resin, water-based polyester resin, water-based polyurethane resin, solventless ultra violet light curable monomers and oligomers, solvent-based polyamides, solvent-based polyimides, water-based polyamides, water-based polyimides, solvent-based epoxy/vinyl/polyester coatings and lacquers, and siloxane resins.

Organic and inorganic pigments can be incorporated into AOM inks/coatings without any adverse effect on the laser markability of the AOM inks/coatings. Further, the AOM inks/coatings containing the organic and inorganic pigments can be milled to desired particle size without difficulty or adverse affect on the laser markability of AOM inks/coatings.

The AOM component may alternatively be melt-incorporated into extrudable polymers, or it may be incorporated into UV-cure monomer formulations. A film or laminate of layers which include a laser-markable component provides a tamper-proof product. Extrudable polymers which can be used in the invention include nylon, polyesters, polyamide, polycarbonate, polyacrylate, polymethacrylate, ABS graft polymers, polyolefins such as polyethylene or polypropylene, polystyrene, polyvinyl chloride, polyoxymethylene, polyimide, polyethers and polyether ketones, thermoplastic elastomers, thermoplastic polyurethane which may be used individually or as a blend of various polymers, are suitable as the polymer matrix. The amount of AOM that is incorporated is typically 0.1 to 5% by weight of the extrudate.

The AOM or analogue thereof should be laser-selective, by which is meant that it absorbs energy at a wavelength, e.g. of ~1064 nm or ~10600 nm, for which a laser can be chosen accordingly, such that it undergoes a colour change. The colour change will typically be the result of a change in valence state and/or the formation of non-stoichiometric products, although there may also be some reaction with the binder. The laser that is used can operate in either the dot matrix mode or continuous-wave, scribing mode.

The substrate may be board, e.g. cartonboard. Packaging that may be used in the invention may alternatively be in the form of a polymeric film, such as polypropylene or polyethylene, and which may be laminated and used, for example, for wrapping chocolate. If a multi-layer packaging material is used, the invention is applicable at whatever layer the ink is present.

Any pigment that is used in the invention may be conventional. A white pigment may be preferred, providing not only contrast with, say, black bar-coding but also opacity. Other colours may be chosen, as desired. Typical pigments include $CaCO_3$, ZnO, TiO_2 and talc.

A formulation of the invention may also include conventional components that are present in order to provide the image. Typically, they include a material that absorbs incident laser light; this material may itself change colour on absorption, or may react with another material to provide a change of colour. Typical reactants include phenols, phenolic resins, carboxylic acids together with a colour-former, e.g. Crystal Violet Lactone. Typical absorbing agents include clays, micas, TiO_2, carbonates, oxides, talc, silicates and aluminosilicates.

In order that the invention may be more readily understood, reference is made to the following Examples, which are intended to be illustrative of the invention, but are not intended to be limiting in scope.

Examples 1 to 7

Solvent, water-based and UV-cure inks were formulated with ammonium octamolybdate (AOM). Lacquers were made in the proportions shown, coated onto cartonboard and dried. They were then marked using a scanning CO_2 laser with a beam diameter of 0.3 mm and a scan speed of 1000 mms^{-1}. The amounts used, and results, are shown in Table 1.

Example 8

197 g polypropylene homopolymer was blended with 3 g of a 4:1 mixture of AOM:Iriodin 805, by mixing well on an Optiblender 2000 (Moulinex). The blend was compounded and palletised on a FOS axon extruder 11502 at temperatures of 190°C, 200°C, 210°C, 220°C and 225°C in the five respective zones. The moulded polymer could be marked with a CO_2 laser.

Examples 9 and 10

The procedure of Example 8 was followed, but using HDPE and HIPS, respectively. The moulded polymers could be satisfactorily marked with Nd-YAG and CO_2 lasers, respectively.

Example 11

An opaque white ink was formulated as below:

Phenolic resin	17%
Colour Former	6%
Binder	7%
TiO_2	6%

Mica	2%
Water	balance

This was printed by flexography to produce a panel on manila corrugate. The resulting white panel was exposed to the beam from a scribing CO_2 laser to produce a one-dimension bar code. The bar code was good quality, with class A/B verification, when the black colour former Pergascript black I- R or Pergascript black I-2R (Ciba Speciality Chemicals) was used.

Example 12

A semi-opaque ink was formulated as described in Example 1, but without the pigment, and was gravure-printed onto white cartonboard. A scribing CO_2 laser was then used to produce alphanumeric and two-dimensional codes in the printed ink. The machine-readable code was of high quality when Pergascript black I-R ,Pergascript Black I-2R or Pergascript Blue I-2G was used.

Example 13

An opaque ink was formulated as in Example 11 and patches were printed by flexography onto flexible packaging film (polypropylene). Alphanumeric codes were then written into the patches using both a scribing and a dot-matrix CO_2 laser.

Example 14

As in Example 13, patches were printed onto polypropylene film. The printed side of the film was then laminated with another sheet of polymeric material so that the printed patch was encapsulated. A CO_2 laser was then used to produce an alphanumeric code within the patch by exposure through the film.

Example 15

A lacquer was formulated, comprising of:

Polyvinyl chloride	30%
Ammonium octamolybdate	15%
Ethyl alcohol	balance

This was coated down onto aluminium foil, using a Meyer bar, and dried. The semi-opaque coating was then exposed to a CO_2 laser beam of 0.3mm diameter sweeping at 1000 mm/second at an output power of 3W, to produce a black image.

Example 16

An opaque ink was formulated as given in Example 11, using a blue Colour Former but also with the addition of a small amount (0.4% by weight) of red pigment. The ink was printed by flexography onto white cartonboard, and the resulting pink panel was exposed to the CO_2 laser beam. The image produced was purple.

Example 17

Ammonium heptamolybdate (AHM)	220 g
Nitrocellulose DLX 3-5	250 g
Ethanol	800 g
Ethyl acetate	200 g

To a stirring solution of ethanol/ethyl acetate, nitrocellulose DLX 3-5 was added gradually. After the addition was complete the mixture was allowed stir at room temperature until a clear solution was obtained. Then a very fine powder of ammonium heptamolybdate was added portion-wise and after the addition was complete the mixture was stirred until uniform dispersion was achieved. This was coated down onto carton board, using a doctor blade, and dried. The semi-opaque coating was then exposed to a CO_2 laser beam of 0.3 mm diameter at a scan speed of 1000mm/second at an output power of 3-4 W, to produce a black image.

Example 18

Texicryl 13-576	100 g
Ammonium heptamolybdate (AHM)	20 g
Ammonia (25%)	0.5 g

To a stirring aqueous emulsion of Texicryl 13-567 (Ciba Speciality Chemicals), a fine powder of ammonium heptamolybdate was added gradually. After addition was complete, the mixture was stirred at room temperature until dissolution of ammonium heptamolybdate was obtained. This was coated down onto carton board, using a doctor blade, and dried. The semi-opaque coating was then exposed to a CO_2 laser beam of 0.3 mm diameter at scan speed of 1000mm /second at an output power of 3-4 W, to produce a black image.

Example 19

Ammonium Dimolybdate (ADM)	220 g
Nitrocellulose DLX 3-5	250 g
IMS	800 g
Ethyl acetate	200 g

To a stirring solution of IMS (industrial methylated spirit)/ethanol/ethyl acetate, nitrocellulose DLX 3-5 was added gradually. After the addition was complete, the mixture was allowed to stir at room temperature until a clear solution was obtained. Then a very fine powder of ammonium dimolybdate was added portion-wise and, after the addition was complete, the mixture was stirred until a uniform dispersion was achieved. This was coated down onto carton board, using a doctor blade, and dried. The semi-opaque coating was then exposed to a CO_2 laser beam of 0.3 mm diameter at scan speed of 1000mm /second at an output power of 3-4 W, to produce a black image.

Example 20

Example 18 was repeated, using ADM instead of AHM and 0.3 g ammonia. Again, a black image was obtained.

Example 21

Example 19 was repeated, using ammonium paratungstate (APW) instead of ADM. Again, a black image was obtained.

Example 22

Example 20 was repeated, using APW instead of ADM. Again, a black image was obtained.

Example 23

Example 19 was repeated, using ammonium metatungstate instead of ADM. Again, a black image was obtained.

Example 24

Example 20 was repeated, using ammonium paratungstate instead of ADM. Again, a black image was obtained.

TABLE 1

EXAMPLE	BINDER	QUANTITY (g)	ADDITIVE	QUANTITY (g)	SOLVENT	QUANTITY (g)	LASER MARKING	
							POWER (W)	COLOUR OF IMAGE
1	Polyvinyl alcohol (Gohsenol GH17)	1.1	AOM	1	Water	9	3	Black
2	Alcotex 395B (26%)	12	AOM	2	Methanol/ methylacetate	-	3	Black
3	Ethyl Cellulose	2	AOM	2	Ethanol	15	3	Black
4	Klucel (hydroxy propyl cellulose)	2	AOM	2	Water	15	3	Black
5	Mowital B30H	2	AOM	2	Ethanol	10	3	Black
6	PVC Vycar 577E	15	AOM	3	Water	9	3	Black
7	Ebecryl 657 Ebecryl 1608	3.5 3.5	AOM	3	Irgacure 651 (Photoinitiator)	0.7	3	Black

Gohsenol was obtained from CIBA Speciality Chemicals
Alcotex was obtained from Harlow Chemicals
Klucel was obtained from Hercules
Mowital was obtained from Hoechst
Vycar was obtained from B.F. Goodrich
Ebecryl was obtained from UCB Chemicals

CLAIMS

1. A laser-markable composition which comprises a binder and an oxyanion of a multivalent metal.

2. A composition according to claim 1, wherein the binder comprises a labile group.

3. A composition according to claim 1 or claim 2, wherein the binder is a polymer.

4. A composition according to any preceding claim, wherein the metal oxyanion is ammonium octamolybdate.

5. A transparent, dyed or pigmented printing ink or coating lacquer comprising the components defined in any of claims 1 to 4.

6. A melt-extrudable composition comprising the components defined in any of claims 1 to 4.

7. A polymer film obtainable by solvent-casting and comprising the components defined in claim 4.

8. A UV-curable medium comprising the components defined in any of claims 1 to 4.

9. An adhesive formulation comprising the components defined in any of claims 1 to 4.

10. A method for providing an image on a substrate, which comprises applying to the substrate a composition according to any of claims 1 to 5, followed by irradiation.

11. A method for providing an image on a substrate, which comprises applying, to a relatively small area of the substrate, a formulation comprising a pigment and one or more other components that form an image on irradiation with laser light, and irradiating the area, wherein the image has greater contrast with respect to the pigment than with respect to the substrate.

12. A method for providing an image on a substrate, which comprises applying, to a relatively small area of the substrate, a formulation comprising one or more components that form an image on irradiation with laser light, wherein the substrate comprises a white pigment.

13. A method according to claim 11 or claim 12, wherein the formulation includes a component that absorbs laser light, e.g. at 10,600 nm.

14. A method according to any of claims 10 to 12, wherein the substrate is a polymeric film.

15. A method according to any of claims 10 to 12, wherein the substrate is metal, e.g. aluminium foil.

16. A method according to any of claims 10 to 12, wherein the substrate is paper or cartonboard.

DERWENT-ACC-NO: 2002-707162

DERWENT-WEEK: 201143

TITLE: Laser remarkable compositions for use in printing ink or coating lacquer, includes oxyanion of multivalent metal

INVENTOR: KHAN N; KHAN N N S ; KHAN N S T ; KHAN N T ; KHAN S T L

PATENT-ASSIGNEE: DATALASE LTD[DATAN] , KHAN N[KHANI] , SHERWOOD TECHNOLOGY LTD[SHERN]

PRIORITY-DATA: 2001GB-008360 (April 3, 2001) , 2001GB-006603 (March 16, 2001)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
WO 02074548 A2	September 26, 2002	EN
US 20030180660 A1	September 25, 2003	EN
EP 1368200 A2	December 10, 2003	EN
AU 2002241108 A1	October 3, 2002	EN
JP 2004522631 W	July 29, 2004	JA
AU 2002241108 A8	October 13, 2005	EN
EP 1657072 A2	May 17, 2006	EN
US 20060147842 A1	July 6, 2006	EN
EP 1368200 B1	December 20, 2006	EN
DE 60216898 E	February 1, 2007	DE
JP 2007069620 A	March 22, 2007	JA
JP 3913680 B2	May 9, 2007	JA
DE 60216898 T2	July 26, 2007	DE
ES 2278008 T3	August 1, 2007	ES
US 7485403 B2	February 3, 2009	EN
EP 1657072 B1	July 1, 2009	EN

DE 60232829 E	August 13, 2009	DE
ES 2327662 T3	November 2, 2009	ES
EP 1368200 B2	June 29, 2011	EN

DESIGNATED-STATES: AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA CH CN CO CR CU CZ DE DK DM DZ EC EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ OM PH PL PT RO RU SD SE S G SI SK SL TJ TM TN TR TT TZ UA UG US UZ VN YU ZA ZM ZW AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZM ZW AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR AT BE CH CY DE DK E S FI FR GB GR IE IT LI LU MC NL PT SE TR AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
WO2002074548A2	N/A	2002WO-GB01250	March 18, 2002
AU2002241108A1	N/A	2002AU-241108	March 18, 2002
AU2002241108A8	N/A	2002AU-241108	March 18, 2002
DE 60216898E	N/A	2002DE-616898	March 18, 2002
DE 60216898T2	N/A	2002DE-616898	March 18, 2002

DE 60232829E	N/A	2002DE-632829	March 18, 2002
EP 1368200A2	N/A	2002EP-706945	March 18, 2002
EP 1368200B1	N/A	2002EP-706945	March 18, 2002
EP 1368200B2	N/A	2002EP-706945	March 18, 2002
JP2004522631W	N/A	2002JP-573239	March 18, 2002
JP 3913680B2	N/A	2002JP-573239	March 18, 2002
US20030180660A1	N/A	2002WO-GB01250	March 18, 2002
EP 1368200A2	N/A	2002WO-GB01250	March 18, 2002
JP2004522631W	N/A	2002WO-GB01250	March 18, 2002
EP 1368200B1	N/A	2002WO-GB01250	March 18, 2002
DE 60216898E	N/A	2002WO-GB01250	March 18, 2002
JP 3913680B2	N/A	2002WO-GB01250	March 18, 2002
DE 60216898T2	N/A	2002WO-GB01250	March 18, 2002
US 7485403B2	PCT Application	2002WO-GB01250	March 18, 2002
EP 1368200B2	PCT Application	2002WO-GB01250	March 18, 2002
US20030180660A1	N/A	2003US-380381	March 14, 2003
US 7485403B2	N/A	2003US-380381	March 14, 2003
EP 1657072A2	N/A	2006EP-000946	March 18, 2002

EP 1657072B1	N/A	2006EP-000946	March 18, 2002
US20060147842A1	N/A	2006US-364407	February 28, 2006
JP2007069620A	Based on	2006JP-324252	November 30, 2006

INT-CL-CURRENT:

TYPE	IPC DATE
CIPP	B41M5/26 20060101
CIPP	B41M5/26 20060101
CIPP	G03C5/00 20060101
CIPP	G03F7/00 20060101
CIPS	B41M5/26 20060101
CIPS	C08K3/10 20060101
CIPS	C08K3/24 20060101
CIPS	C08K3/24 20060101
CIPS	C08K3/24 20060101
CIPS	C09D101/18 20060101
CIPS	C09D101/18 20060101
CIPS	C09D101/18 20060101
CIPS	C09D101/28 20060101
CIPS	C09D101/28 20060101
CIPS	C09D101/28 20060101
CIPS	C09D11/02 20060101
CIPS	C09D11/02 20060101
CIPS	C09D11/02 20060101
CIPS	C09D127/06 20060101
CIPS	C09D127/06 20060101
CIPS	C09D127/06 20060101
CIPS	C09D129/04 20060101
CIPS	C09D129/04 20060101

CIPS	C09D129/04 20060101
CIPS	C09D129/14 20060101
CIPS	C09D129/14 20060101
CIPS	C09D129/14 20060101
CIPS	C09J127/06 20060101
CIPS	C09J129/04 20060101
CIPS	C09J129/14 20060101

RELATED-ACC-NO: 2005-172817

ABSTRACTED-PUB-NO: WO 02074548 A2

BASIC-ABSTRACT:

NOVELTY - A laser remarkable compositions comprises a binder and an oxyanion of a multivalent metal.

DESCRIPTION - An INDEPENDENT CLAIM is included for a method for providing an image on a substrate comprising applying, to a small area of the substrate, a formulation comprising a pigment and other component(s) that form an image on irradiation with laser light, and irradiating the area. The image has greater contrast with respect to the pigment than with respect to the substrate.

USE - For use in transparent, dyed or pigmented printing ink or coating lacquer; melt-extrudable composition; UV-curable medium; adhesive formulation; and for polymer film obtainable by solvent casting (claimed).

ADVANTAGE - The composition absorbs at the wavelength of carbon dioxide laser light and undergoes a color change due to a change in oxidation state, but is not affected by ultraviolet light (commonly used for polymer curing) or by the temperatures, typically around 200-300degreesC, used in extrusion.

EQUIVALENT-ABSTRACTS:

POLYMERS

Preferred Component: The binder is a polymer, and preferably includes a labile group. The substrate may be a polymer film, metal (e.g., aluminum foil), paper, or cartonboard. Preferred Formulation: The formulation includes a component that absorbs laser light, e.g. at 10600 nm.

SPECIFIC COMPOUNDS

The metal oxyanion is ammonium octalmolybdate.

An opaque white ink was formulated comprising phenolic resin (17), color former (6), binder (7), titanium oxide (6), mica (2), and balance of water. This was printed by flexography to produce a panel of manila corrugate. The resulting white panel was exposed to the beam from a scribing carbon dioxide laser to produce a one-dimension bar code. The bar code was good quality, with class A/B verification, when the black color former Pergascript black I-R or Pergascript black I-2R was used.

TITLE-TERMS: LASER REMARKABLE COMPOSITION PRINT INK COATING LACQUER OXYANION MULTIVALENT METAL

DERWENT-CLASS: G02 P75 P83 P84 T04

CPI-CODES: G02-A02B; G02-A04A;

EPI-CODES: T04-G04;

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: 2002-200698

Non-CPI Secondary Accession Numbers: 2002-557491